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**US-A- 3 229 605**  
**US-A- 3 238 858**  
**US-A- 3 821 761**  
**US-A- 3 943 786**

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## Description

This invention relates to photographic systems. More particularly, it concerns a method and apparatus for storing, exposing and processing photographic film from which a positive print or transparency is formed by exposing an initially separate negative sheet and bringing the negative into face-to-face contact with a positive image receiving sheet previously coated or impregnated with a processing agent capable of effecting image transfer from the exposed negative to the positive receiver.

U.S. Patent No. 3,907,563 discloses a diffusion transfer process in which the image receiving element or sheet is impregnated with an alkaline processing composition. The image receiver or positive sheet includes a transparent support through which the final image may be observed in an image receiving coating or layer directly on the transparent support. Reflectivity for use of the system as a positive print is provided by a white pigmented layer backed by an opaque layer. The three layers thus provided on the transparent support are impregnated with a liquid alkaline processing agent common to diffusion transfer film processing.

The negative element of the system disclosed in the aforementioned patent includes a support of Mylar® or similar material which may be either transparent or opaque. The negative support is coated by polymetric acid layer, a timing layer, a dye developer layer and finally a silver halide layer. After exposure of the silver halide layer on the negative, the two sheets are brought together in intimate face-to-face contact as a laminate with the several coatings situated between the respective negative and positive sheet supports. The processing agent functions to transfer the latent image formed by exposure of the silver halide layer of the negative to the image-receiving layer directly behind the transparent support of the receiver sheet. The acid layer in the original negative sheet functions to neutralize the alkaline processing fluid but under the control of the timing interlayer situated between the acid layer and the remaining layers of the composite laminate.

The diffusion transfer system disclosed in U.S. Patent No. 3,907,563 is especially attractive from the standpoint of attaining high quality photographs with virtually no provision for assuring uniformity of processing fluid spread between the respective negative and positive elements other than impregnation of the positive element during manufacture. In this respect, it is to be noted that in substantially all commercially available diffusion transfer film systems, the alkaline processing fluid is initially contained by a rupturable pod, carried as a component of the film assembly, to be spread between

the negative and positive elements of the film assembly after negative exposure. The uniformity of this spread requires precision not only in the processing apparatus which is incorporated as a part of a camera or equivalent, but also a sophisticated and expensive combination of elements in the film sheet assembly, itself.

While a film system of the type disclosed in U.S. Patent No. 3,907,563 has potential for significant reduction in costs over current diffusion transfer systems particularly in the manufacture of film, use of such film on a commercial basis is not without problems. Because of the strongly alkaline character of the processing agent and the need for its neutralization after processing, the components carrying the processing agent and the neutralizing acid layer must be kept separate until the processing step is performed. Also, it is important that the liquid processing agent in the positive sheet element be kept from evaporation and that the pH level of the liquid be maintained. Moreover, these conditions must be maintained not only for the normal shelf life of commercial photographic film but also after the film is loaded into a camera and stored in the camera. In addition, the film system requires an image reversal prior to negative exposure because the positive image observed through the transparent support on the receiving element is identical with the image received on the negative. In other words, a reflex mirror is required between the lens and the film plane of the camera in which the film system is to be exposed.

U.S. Patent No. 3,314,792 discloses a camera system for accommodating photographic film in which a processing liquid is impregnated in or coated on one of two sheet elements. In this instance, the negative and positive sheet elements are separately packaged and thus separately mounted in the camera in order to solve the problem of sealing the processing the liquid impregnated component of the film system to maintain the pH level of the processing liquid and also to prevent its drying out. Other prior U.S. patents which address this problem include U.S. Patents No. 3,229,605; No. 3,238,858; and No. 3,314,791.

US-A-3 229 605 represents prior art of the kind as specified in the preamble of claim 1. In this case the storage chambers are provided within a camera housing and they are loaded separately by coiled film elements. The image receiving sheet is coiled with the liquid impregnated image receiving layer facing inwardly or outwardly. The image receiving sheet is coiled tightly upon itself to help prevent contact between the liquid impregnated image receiving layer and the atmosphere of the container. However, during use of the film unit the coil of the image receiving sheet becomes loose and therefore large areas of the impregnated image

receiving layer can be contacted by the atmosphere within the container. In order to prevent loss of processing liquid by evaporation from the image receiving layer the atmosphere of the container must be maintained saturated with water vapor by the provision of a reservoir of water or processing liquid. This reservoir of excess processing liquid or water may comprise the image receiving layer itself, which may be impregnated with excess liquid which must be removed by squeegeeing during withdrawal of the receiving sheet from the container.

A principle object of the present invention is the provision of a photographic apparatus using an image receiving strip coiled in a container and impregnated with a processing fluid used for image transfer when superposed with a negative strip, wherein the amount of processing liquid is kept at a minimum and nevertheless is sufficient for adequate image transfer and wherein easy handling of the photographic material is achieved.

In accordance with the present invention the problems as stated above are solved by the features of the characterizing portion of claim 1.

Since the storage chambers and the film plane are provided in a cassette, which can be easily inserted into the photographic apparatus, it is no more necessary to place the individual film coils into the respective storage chambers of the photographic apparatus. Also the camera is protected against contamination by aggressive processing fluid. Since the coiled web is maintained with its surface contacted by the surface of adjacent coils, there is a minimum and constant area exposed to the atmosphere in the container, even if parts of the web are already consumed. Thereby amount of processing fluid may be maintained on a minimum.

Further developments and improvements of the invention are specified in subclaims 2 through 11.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view illustrating a cassette structure used in the invention;

Fig. 2 is a cross-section on line 2-2 of Fig. 1;

Fig. 3 is a top plan view of the cassette illustrated in Fig. 1 partly in cross-section;

Fig. 4 is a cross-section on line 4-4 of Fig. 3;

Fig. 5 is an exploded perspective view illustrating the interior of an enclosed chamber at one end of the cassette shown in Fig. 1;

Fig. 6 is a fragmentary cross-section illustrating the film system used in the present invention;

Fig. 7 is a schematic illustration illustrating a film advance mechanism of the invention;

Fig. 7A is a fragmentary cross-section on line A-A of Fig. 7;

Fig. 8 is a schematic side elevation illustrating a

stopper actuating mechanism used in the invention;

Fig. 8B is a fragmentary cross-section on line B-B of Fig. 8;

Fig. 9 is a similar schematic side elevation illustrating a cutter actuating means in accordance with the invention; and

Fig. 10 is a flow chart illustrating a cycle of operation of the invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of a cassette 10 is illustrated in Figs. 1-4. The cassette includes a central tray-like section 12 having a generally planar floor 14 (Fig. 4) and a pair of side walls 16 and 18. The side walls 16 and 18 are of a height enabling them to extend both above and below the floor 14 and are connected under the floor 14 by transverse web formations 19 to provide strength in the overall cassette structure. Guide bosses 20 are provided on the interior of the side walls 16 and 18 to assist in guiding a negative web N longitudinally for the length of the central section 12.

Fixed at opposite ends of the central tray-like section 12 are generally cylindrical housings 22 and 24 oriented on parallel axes 26 and 28, respectively. The housings 22 and 24 respectively define interior, generally cylindrical chambers 30 and 32 for coiled web elements of a film system exemplified by U.S. Patent No. 3,907,563. In particular, a coiled web of a negative film element N is contained in the chamber 32 defined by the housing 24. Similarly, a coiled web or spool of a positive film element P is contained in the chamber 30 defined by the housing 22.

The negative film chamber 32 defined by the housing 24 is principally a light-tight enclosure and includes a slot-like opening 36 spaced slightly above the floor 14 of the central tray section 12. Although the coil of the negative element N may be supported on a spool (not shown) journaled in the housing 24, it is adequately supported as a coil resting on an arcuate floor portion 38 at the bottom of the housing 24 where movement of a flight of the web N along the floor 14 of the tray section 12 causes clockwise rotation of the coil as viewed in Fig. 4 of the drawings, for example.

The housing 22 is designed to accommodate the one of the two elements of a film system (U.S. Patent No. 3,907,563) which carries a liquid processing agent either as an impregnation of web portions constituting that element or as a coating on that web element. As in the aforementioned patent, the web element P contained in the chamber 30 is the positive image receiving element of the film system. In this regard, the chamber 30 is

made of suitable material and wall thickness relatively impermeable to air and moisture. The web element P is illustrated as coiled on a hollow core 40 having a length exceeding that of the web width so that the core extends axially at opposite ends of the web convolutions.

As shown in Figs. 2 and 4, the housing 22 also includes a slot opening 42 by which the positive web element P may be passed from the chamber 30 in the direction of the central tray section 12. The opening is positioned slightly above the level of the floor 14 and is defined on the exterior of the housing 22 as a smoothly curved, outwardly flared and continuous lip 44 circumscribing the slot 42. An elastomeric stopper 46 of generally triangular cross-section is supported by a semi-cylindrical leaf spring 48 which extends from the area of the opening to the opposite side of the housing 22 so that the spring force acts across the housing. The configuration of the elastomeric stopper 46 closely complements the exterior shape of the opening 42 as defined by the lip 44 and under the bias of the spring 48 effects a relatively air-tight closure of the opening 42. The spring 48 includes a pair of axially extending tabs 50 near the mount for the stopper 46 to facilitate opening movement of the stopper 46 from the lip 44 in a manner to be described in more detail below.

As shown in Figs. 3 and 4, the positive web element P coiled about the hollow core 40 is supported in the chamber 30 for radial movement in the direction of the slot opening 42 in a manner so that the outer periphery of the coiled web element P will remain in close proximity to or in contact with the housing interior in the region of the slot 42 with changes in diameter of the coiled web P. To this end, opposite ends of the housing 22 are shaped to guide the projecting ends of the core 40 toward the opening 42. Specifically, the end walls of the housing 22 are formed having spaced lower and upper ramp formations 52 and 54, respectively. The ramp formations are spaced by the approximate outside diameter of the core 40 so that the latter will be biased toward the slot 42. Leaf springs 56, cantilevered from slot formations 58 at the lower rear ends of the interior of the housing 22, bias the core and thus the periphery of the coiled web element P against the housing interior in the region of the slot 42. Additionally, the springs 56 provide a slight frictional drag opposing rotation of the coil and of the core 40 to assure that convolutions of the coiled web P will remain in intimate contact with each other. Alternately, the core 40 can be eliminated, and the web allowed to clockspring outwardly within the chamber 30.

The described construction of the housing 22 as including the stopper 46 and lip configuration about the slot opening 42 to effect a releasable or

openable seal for the chamber 30 coupled with the augmenting of this seal by retaining the outer periphery of the coiled positive web P against the inner inside of the slot 42, will be effective to retain a liquid processing agent impregnated in or coated on the web P. As an additional measure of assuring that the liquid processing agent will be retained in operable condition on the web P while it is in the chamber 30, a sacrificial supply of water or other liquid reagent is provided within the chamber 30. While such a reagent may be supplied very simply by impregnating a sponge or other porous element located in the hollow spool core 40, it is preferred that the water or other liquid be maintained in proximity to the opening slot 42. To this end, the interior surfaces of the housing on opposite sides of the slot 42 secure a pair of absorbant strips 58 and 60 whose inner surfaces conform with the outer periphery of the coiled web P (see Fig. 5). As a result, the strips enhance the sealing effect about the slot 42 from the interior of the housing 22 by the outer periphery of the coiled web and contain the water or other liquid where it is likely to be first evaporated. Also, any portion of the web P extending from the coil in the chamber will be assured of a vapor laden atmosphere to inhibit evaporation of the processing agent from that portion of the web P. The biasing of the web P against the inside of the slot whether by the coil bias illustrated or by clockspring, etc., minimizes the exposed length of the agent carrying surface of the web P and also tends to maintain this length constant. Hence, the exposed area of the agent is minimized and maintained constant. Further in this respect, it will be noted that at the ends of the chamber 30 and for approximately the width of the strip 60, slightly elevated convolute tracks 62 are provided so that as the coiled web P is advanced toward the slot 42, the extent to which it can compress the strip 60 is limited.

Although water alone is, in many instances, an adequate liquid medium to prevent loss of the processing agent from the web P, it may be desirable to maintain the high pH level of the processing agent on the web P by providing a "getter" for any carbon dioxide which may enter the chamber 30 through the slot as the latter is opened during operation in a manner to be described. U.S. Patent No. 3,907,563 mentions, for example, that calcium hydroxide may be provided for reacting with carbon dioxide where potassium hydroxide is used in the liquid processing agent. Alternatively, potassium hydroxide, barium hydroxide and calcium hydroxide may be used in the chamber 30 as a getter for carbon dioxide when sodium hydroxide is incorporated in the processing liquid. Regardless of the liquid material retained in the chamber 30, the structural organization of the strips 58 and 60 will

enhance the intended application of such materials.

As shown in Fig. 6, the positive web P includes a transparent substrate 64 on which an image receiving layer 66 is directly coated. A white pigmented layer 68 follows the image receiver layer 66 and finally an opaque layer 70 defines the surface of the web opposite from the support 64. The processing agent referred to above, as disclosed in U.S. Patent No. 3,907,563, may be either impregnated in the layers 66, 68 and 70 or incorporated as an additional layer on the opaque layer 70.

The negative web N is also provided with a support 72 which may be either opaque or transparent. If it is transparent, it is coated with an opaque layer 74 followed by a polymeric acid layer 76, a timing interlayer 78, a dye developer layer 80 and finally a silver halide layer 82. Where the support 72 is opaque, the layer 74 may be omitted. Also it will be noted that the acid layer 76 is provided to neutralize the alkaline processing agent carried by the positive web P after the two webs P and N have been brought together for processing. The timing interlayer 78 slows this neutralization process in order to assure full processing of the image forming layers. In the final product, the resulting positive image is viewed through the transparent support 64 of the positive web P.

The film elements P and N are supplied as coils within the chambers 30 and 32 with the support layers 64 and 72 on the respective coils facing outwardly. Thus, as the web element N is payed out from the coil in the chamber 32, through the opening 36 and along the floor of the cassette 10, the support 72 thereof will be in contact with the floor 14 whereas the silver halide layer 82 will be presented upwardly. The positive film element sealed in the chamber 30 will pay out from the coil on the spool core 30 about the curved bottom lip of the opening 42 with the support 64 thereof in contact with the surfaces of the lip 44 about the slot 42. From the slot 42, the positive element P passes into face-to-face contact with the active layers on the negative element N under pressure exerted by a pair of rollers 84 and 86.

Although the camera or other dark chamber apparatus with which the cassette 10 will be used in practice is not fully shown in the drawings, portions of such apparatus are illustrated in Fig. 4. In particular, fragments of a camera body are designated by the reference numeral 88, such a body having a hinged door 90 pivotally mounted from the body on an axis 92. The size of the door will therefor allow the cassette 10 to be inserted into the camera body 88. Image light passing an objective lens (not shown) is reflected and reversed by a reflex mirror (not shown) downwardly to the negative element N overlying the floor 14 of the cas-

sette.

Because a cassette of the type represented by the cassette 10 is a single-use device or a device which is disposed of after the film originally supplied therein has been used, it is important that the number and expense of components mounted on the cassette be restricted to reduce costs. In this respect, it is noted that the pressure rollers 84 and 86 necessary for a film system of the type described do not require a high degree of precision and may be relatively simple elastomeric rollers. It is therefore possible and practical for both rollers 84 and 86 to be mounted on and made a permanent part of the cassette 10. On the other hand, initial handling of leaders by which the film elements P and N are initially positioned in the nip of the rollers 84 and 86 will be facilitated where one of the rollers is movable relative to the other. As illustrated, the roller 86 is journaled in the side walls 16 and 18 of the cassette 10 whereas the roller 84 is rotatably supported from the door 90 of the camera or other exposure apparatus in which the cassette 10 is used. For lowest cassette cost, both rollers are mounted in and remain a part of the camera or other exposure and/or processing apparatus. In addition, a guillotine-type cutter knife 94 and cutting anvil 96 are mounted on the door 90 and operated in a manner to be described.

In Figs. 7-9 of the drawings, camera or exposure apparatus mounted parts cooperative with the cassette 10 are illustrated schematically to facilitate an understanding of how the rollers 84 and 86, the stopper 46 and the cutting knife 94 may be operated in practice. Thus in Fig. 7, a drive organization for the rollers 84 and 86 is illustrated as including an electric motor 100 having a drive gear 102 in mesh with a transfer gear 104 rotatable on a fixed axis 106. A drive gear 108 is carried by a beam 110 for rotation on an axis 112 near one end of the beam 110 and is in meshing engagement at all times with the transfer gear 104. The opposite end of the beam 110 carries an offset pawl 112' for engagement in sprocket-like apertures 113 provided along one marginal edge of the negative film element N. A programming disk 114, supported by the camera or other exposure apparatus for rotation about an axis 116, carries a cam projection 118 in a position to engage and lift the pawl end of the beam 110 from the position shown in Fig. 7, rocking the beam to a position where the drive gear 108 drops into engagement with a gear 120 coupled for rotation with the pressure roller 84. As a result of the organization shown in Fig. 7 and 7a, the negative film element may be held against transfer movement when the pawl 112 is engaged in one of the apertures 113. When the pawl 112 is lifted out of such engagement with the negative element N, the pinch rollers 84 and 86 will be

driven to advance the film under power supplied by the motor 100.

In Figs. 8 and 8b, a mechanism is illustrated for temporarily withdrawing the stopper 46 from the slot opening 42 of the housing 22 during advancing movement of the film elements P and N. In particular, a pair of plate brackets 122 (only one being shown) are pivotally supported from an axis 124 to lie on opposite sides of the using 22 when the cassette 10 is in place. The brackets 122 carry inwardly directed pins 126 which, when the cassette is in place, lie behind the laterally projecting tabs 50 on the spring 48. Thus, counterclockwise pivotal movement of the bracket 122 about the axis 24 will cause the stopper 46 to be moved away from the lip 44 of the slot 42. To effect this movement, a programming disk 128, rotatably supported on a fixed axis 130 in the camera or other exposure apparatus, carries a pair of camming projections 132 and 134. The camming projection 132 is engageable with an inwardly directed tang 136 on each bracket plate 122 so that clockwise rotation of the disk 28 will lift the tang 136 into engagement by and for support by a pivotal hook 138. The cam projection 134 is positioned to engage the bottom of the hook 138 and pivot it out of supporting engagement with the tang 136, so that the spring 48 will return the stopper 46 to its sealed position against the lip 44 of the slot 42.

In Fig. 9, a cutting knife actuator is shown as including a bracket plate 140 pivotally mounted from an axis 142 and having a depending arm portion 144 situated behind an abutment 146 on the cutting knife 94. The cutting knife 94 is biased against the arm portion 144 by a spring 148. A follower surface 150 on the bracket plate 142 is positioned to be engaged by a camming projection 152 on a disk 154 rotatably supported from the camera or other exposure apparatus on a fixed axis 156. Thus, counterclockwise rotation of the disk 154 will cause the camming projection 152 to engage the surface 150 on the bracket 140 and advance the knife 94 toward the anvil 96.

In practice, the programming disks 114, 128 and 154 are interconnected to each other and to the motor 100 by gear means (not shown) so that the respective operations resulting from rotation of the disks may be synchronized in a complete cycle of film exposure and processing. In Fig. 10 of the drawings, the successive steps of an exemplary operation cycle for a single-lens-reflex (SLR) camera is depicted by a flow chart. In an SLR camera, the mirror (not shown) is pivoted for movement between an exposure position and a viewing position in which it is normally latched against a biasing means (not shown) for moving the mirror to the exposure position. The described organization of the mirror is conventional to SLR cameras and, as

such, well known to those skilled in the art. Also, it is to be noted that in the "rest" state of a camera designed for the operational cycle depicted by the flow chart in Fig. 10, and in accordance with the invention, the stopper 46 is closed, the knife 94 is held in a closed position by the camming projection 152 on the disk 154, the motor 100 is off and the camera shutter (not shown) is open.

A camera containing the cassette 10, therefore, may be operated by viewing the subject matter to be photographed and when appropriate framing and focusing has been accomplished in the usual manner, a shutter button (not shown) is depressed causing the shutter to be closed and the mirror (not shown) to be moved to the exposure position. The shutter is then opened and closed to expose a frame on the negative element N overlying the floor 14 of the central tray section 12 of the cassette 10. The motor 100 is then switched on to first reposition the camera mirror and shutter and then drive the disk 128 to move the stopper 46 away from the opening 42 of the cassette housing 22. The knife 94 is moved to its open position by rotation of the disk 154 as rotation of the disk 114 elevates the pawl end of the beam 112 out of engagement with the negative film element and until the gear 108 moves into engagement with the gear 120. The latter operation causes the rollers 84 and 86 to rotate, transporting both film elements through the nip of the two rollers. When the exposed area of the negative N has been advanced completely through the roller nip, together with an equal length of the positive film element P from the housing 22, the pawl 112 drops back into a notch 113 in the negative film element N and the hook 138 is released allowing the stopper 46 to move against and re-seal the opening 42. Finally, the knife 94 is actuated to sever the composite film laminate ejected from the camera and the motor is turned off.

A cycle of operation using a non-SLR or "viewfinder" camera is similar to that illustrated in Fig. 10 except that the mirror (not shown) would be permanently in the exposure position, and the normal or rest condition of the camera shutter would be closed. Thus, in such a camera, depressing the shutter button would initially open and close the shutter to effect the exposure mode and move directly to opening and latching the stopper 46. Apart from these differences, the cycle of operation involving the parts illustrated in Figs. 7-9 would be the same.

In light of the foregoing, it will be noted that the positive film element P, which is initially coated or impregnated with liquid processing agent, is at all times sealed within the housing 22 and yet the housing may be opened to allow unobstructed transfer of the film element P from the housing 22

during operation of the processing rollers 84 and 86. Moreover, the retention of the knife 94 in its closed position at all times other than during passage of the film through the nip defined by the pressure rollers 84 and 86 acts in the manner of an auxiliary closure between any part of the film remaining in the camera and the camera exterior. As a result, all components of the positive film element P are isolated from the atmosphere in a manner to inhibit the evaporation of processing fluid from the element P. Effective operation of the system, therefore, is provided even when the camera in which the cassette 10 is loaded is left unused for relatively long periods of time between exposure cycles.

Thus it will be seen that as a result of the present invention, a highly effective method and apparatus is provided for handling film systems of the type described and by which the principle objective, among others, are completely fulfilled.

#### Claims

1. Photographic apparatus for a film system having a pair of film elements (P,N) one of which (P) includes a processing agent and the other of which (N) includes a photographic negative, said apparatus comprising:
  - spaced first and second discrete storage chambers (30, 32) for the processing and negative elements (P,N) of said film system, respectively, both said storage chambers (30,32) having openings (42,36) for the passage of the respective elements therefrom;
  - means (14) situated between said storage chambers (30,32) to present the negative element (N) for exposure;
  - means (84,86) for withdrawing the film elements from said storage chambers (30,32) and for bringing said processing and negative elements (P,N) into face-to-face contact after exposure of the negative element (N);
  - movable means (46) for sealing the opening (42) of said first storage chamber (30); and
  - means (122,126,150) for withdrawing said movable means (46) from the opening (42) of said first storage chamber (30) during passage of the element (P) carrying the processing agent from said first storage chamber (30), wherein the element (P) of the film system carrying the processing agent is supplied in said first storage chamber (30) as a coiled web, characterized in that said storage chambers (30,32) and said presenting means (14) are elements of a cassette (10) which is arranged to be inserted into the photographic apparatus, that means (56; 52,54) are provided for biasing

at least a portion of the outer periphery of said coiled web (P) against the inner surface of said first chamber (30) in the region of said opening (42) to minimize and to maintain constant the uncoiled web area with the processing agent, and that said means for biasing said portion of the outer periphery of said coiled web (P) against the inner surface of said first chamber (30) comprises ramp means (52,54) for supporting said coiled web (P), said ramp means being inclined toward said opening (42) of said first chamber (30).

2. The apparatus of claim 1 wherein said means for withdrawing the film elements (P, N) and for bringing the elements into face-to-face contact comprises a pair of pressure rollers (84, 86) located adjacent to the opening (42) of said first chamber (30).
3. The apparatus of claim 2 comprising means (100) for alternately driving said pressure rollers (84, 86) to withdraw the film elements (P, N), and holding at least one of said elements against movement.
4. The apparatus of claim 1 wherein said movable means for sealing the opening of said first storage chamber (30) comprises a stopper (46) and means (48) for releasably retaining said stopper (46) in sealing engagement with the opening (42) of said first chamber (30).
5. The apparatus of claim 4 wherein said releasable retaining means comprises a leaf spring (48) fixedly mounted in relation to said first chamber (30), said leaf spring (48) supporting said stopper (46).
6. The apparatus of claim 1 wherein said means for biasing said portion of the outer periphery of said coiled web (P) against the inner surface of said first chamber (30) further include spring means (56) to bias said coiled web (P) along said ramp means (52, 54) toward the opening (42) of said first chamber.
7. The apparatus of claim 1 including means (58, 60) for retaining a sacrificial liquid in said first chamber (30).
8. The apparatus of claim 7 wherein said means for retaining a sacrificial liquid in said first chamber (30) comprises a pair of absorbent strips (58, 60) supported in said first chamber (30) on opposite sides of the opening (42) of said first chamber.

9. The apparatus of claim 4, wherein at the exterior of housing of said first chamber (30) a smoothly curved, continuous lip (44) is provided, circumscribing the slot-like opening (42), and wherein said stopper (46) comprises an elongated elastomeric body of generally triangular cross-section to complement the shape of said lip (44).

10. The apparatus of claim 5 wherein said leaf spring (48) is mounted to the exterior of said first chamber (30), said leaf spring supporting said stopper (46) and biasing same into said sealing position.

11. The apparatus of claim 10 wherein said opening (42) of said first chamber (30) extends longitudinally along a given portion of said first chamber (30) and said leaf spring (48) extends from the area of said opening around said first chamber (30) to an opposite side thereof so that the spring force acts across said first chamber.

#### Revendications

1. Appareil photographique pour système de film comportant une paire d'éléments de film (P,N) dont l'un (P) comprend un agent de traitement et dont l'autre (N) comprend un négatif photographique, ledit appareil comprenant :

des première et seconde chambres d'emmagasinage discrètes et espacées (30,32) pour les éléments de traitement et négatif (P,N) du système de film, respectivement, les deux chambres d'emmagasinage (30,32) comportant des ouvertures (42,36) pour le passage des éléments respectifs qui en proviennent;

un moyen (14) situé entre les chambres d'emmagasinage (30,32) de manière à présenter l'élément négatif (N) à une exposition;

des moyens (84,86) pour extraire les éléments de film des chambres d'emmagasinage (30,32) et pour amener l'élément de traitement (P) et l'élément négatif (N) en contact face contre face après une exposition de l'élément négatif (N);

un moyen mobile (46) pour fermer de façon étanche l'ouverture (42) de la première chambre d'emmagasinage (30); et

des moyens (122, 126, 150) pour extraire le moyen mobile (46) de l'ouverture (42) de la première chambre d'emmagasinage (30) pendant le passage de l'élément (P) transportant l'agent de traitement depuis la première chambre d'emmagasinage (30), l'élément (P) du système de film transportant l'agent de traitement étant disposé dans la première chambre

d'emmagasinage (30) sous la forme d'une bande enroulée,

caractérisé en ce que les chambres d'emmagasinage (30,32) et le moyen de présentation (14) sont des éléments d'une cassette (10) qui est conçue pour être introduite dans l'appareil photographique, en ce que des moyens (56; 52,54) sont présents pour pousser au moins une partie de la périphérie extérieure de la bande enroulée (P) contre la surface intérieure de la première chambre (30) dans la région de l'ouverture (42) pour réduire à un minimum et pour maintenir constante la zone déroulée de la bande ainsi que l'agent de traitement, et en ce que les moyens pour pousser la partie de la périphérie extérieure de la bande enroulée (P) contre la surface intérieure de la première chambre (30) comprend des moyens formant rampes (52,54) pour supporter la bande enroulée (P), les moyens formant rampes étant inclinés en direction de l'ouverture (42) de la première chambre (30).

2. Appareil selon la revendication 1, dans lequel les moyens servant à extraire les éléments de film (P,N) et à amener ces éléments en contact face contre face comprennent une paire de rouleaux presseurs (84,86) disposés au voisinage de l'ouverture (42) de la première chambre (30).

3. Appareil selon la revendication 2, comprenant un moyen (100) pour entraîner alternativement les rouleaux presseurs (84,86) de manière à extraire les éléments de film (P,N) et à empêcher de se déplacer au moins un desdits éléments.

4. Appareil selon la revendication 1, dans lequel le moyen mobile servant à fermer de façon étanche l'ouverture de la première chambre d'emmagasinage (30) comprend un élément d'obturation (46) et un moyen (48) pour retenir de façon libérable l'élément d'obturation (46) en contact d'étanchéité avec l'ouverture (42) de la première chambre (30).

5. Appareil selon la revendication 4, dans lequel le moyen de retenue libérable comprend une lame de ressort (48) montée de façon fixe par rapport à la première chambre (30), la lame de ressort (48) supportant l'élément d'obturation (46).

6. Appareil selon la revendication 1, dans lequel les moyens servant à pousser ladite partie de la périphérie extérieure de la bande enroulée (P) contre la surface intérieure de la première



- chambre (30) comprennent, en outre, un ressort (56) pour pousser la bande enroulée (P) le long des moyens formant rampe (52,54) en direction de l'ouverture (42) de la première chambre.
7. Appareil selon la revendication 1, comprenant des moyens (58,60) pour retenir un liquide sacrifié dans la première chambre (30).
8. Appareil selon la revendication 7, dans lequel les moyens servant à retenir un liquide sacrifié dans la première chambre (30) comprennent une paire de bandes absorbantes (58,60) supportées dans la première chambre (30) de part et d'autre de l'ouverture (42) de la première chambre.
9. Appareil selon la revendication 4, dans lequel à l'extérieur du boîtier de la première chambre (30) se trouve une lèvre continue (44) courbée de façon uniforme et délimitant l'ouverture (42) analogue à une fente, et dans lequel l'élément d'obturation (46) comprend un corps élastomère allongé de section droite triangulaire d'une façon générale afin de compléter la forme de la lèvre (44).
10. Appareil selon la revendication 5, dans lequel la lame de ressort (48) est montée sur l'extérieur de la première chambre (30), la lame de ressort supportant l'élément d'obturation (46) et le poussant dans la position de fermeture étanche.
11. Appareil selon la revendication 10, dans lequel l'ouverture de la première chambre (30) s'étend longitudinalement le long d'une partie donnée de la première chambre (30) et la lame de ressort (48) s'étend depuis la zone de ladite ouverture de la première chambre (30) jusqu'à un côté opposé de cette dernière, de telle sorte que la force du ressort agisse transversalement à la première chambre.

#### Patentansprüche

1. Photographischer Apparat für ein Filmsystem, das zwei Filmelemente (P,N) aufweist, von denen das eine (P) ein Behandlungsmittel und das andere (N) ein photographisches Negativ aufweist, wobei der Apparat folgende Teile umfaßt:
- eine erste und eine hierzu im Abstand angeordnete, getrennte zweite Speicherkammer (30,32) für das Behandlungs- bzw. Negativelement (P,N) des Filmsystems, wobei beide Speicherkammern (30,32) Öffnungen (42,36)

für den Durchtritt der jeweiligen Elemente nach außen aufweisen;

eine Einrichtung (14), die zwischen den Speicherkammern (30, 32) angeordnet ist, um das Negativelement (N) für die Belichtung bereitzuhalten;

Mittel (84,86), um die Filmelemente aus den Speicherkammern (30,32) wegzuziehen und um die Behandlungs- bzw. Negativelemente (P,N) nach der Belichtung des lichtempfindlichen Elementes (N) in flächenhafte Berührung zu bringen;

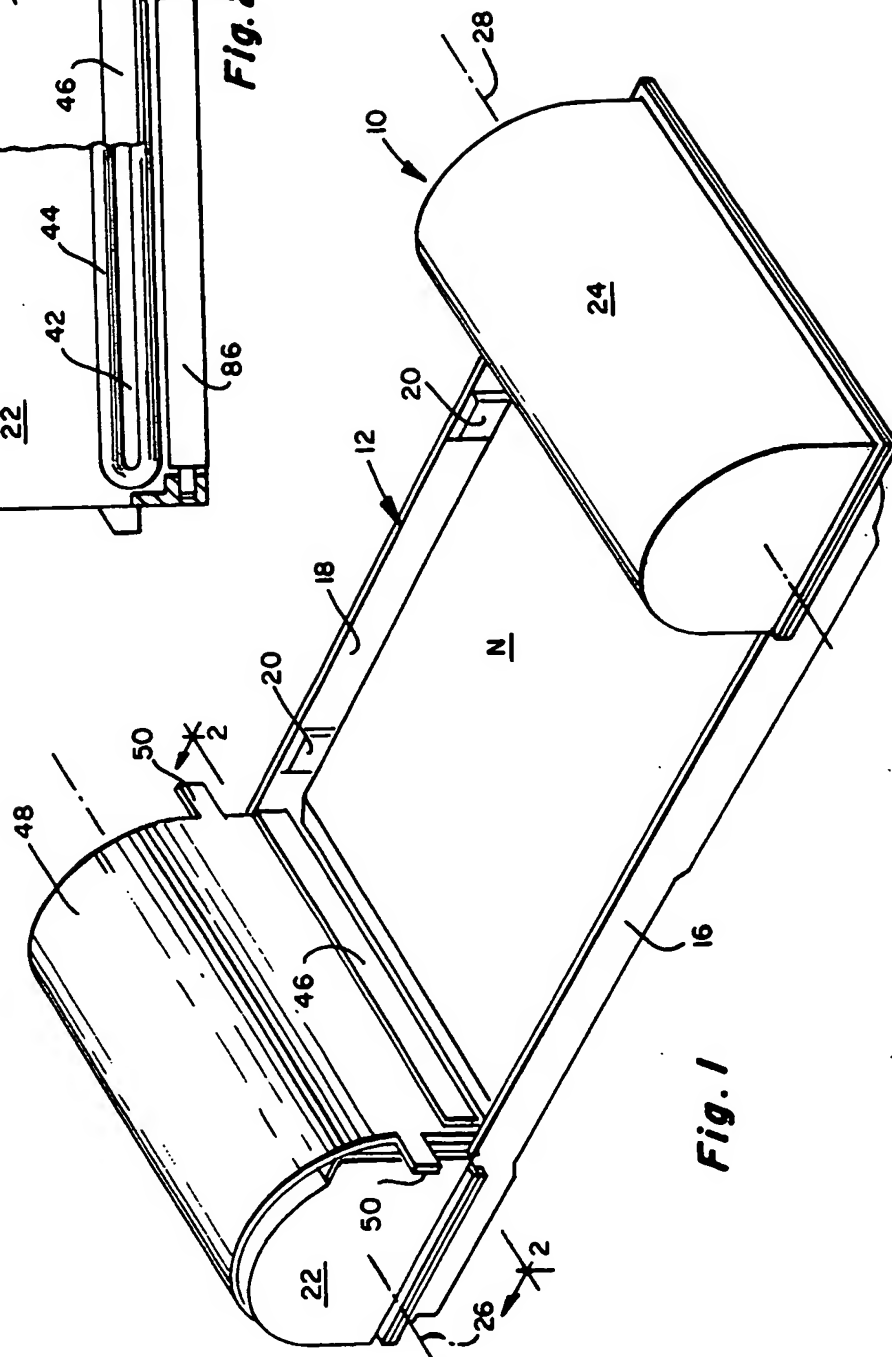
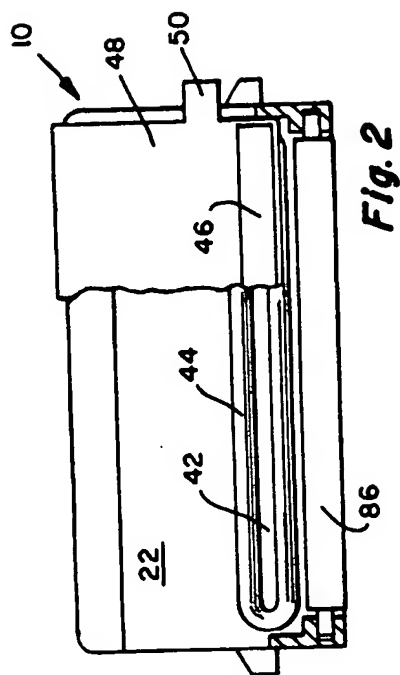
eine bewegliche Einrichtung (46), um die Öffnung (42) der ersten Speicherkammer (30) abzudichten und

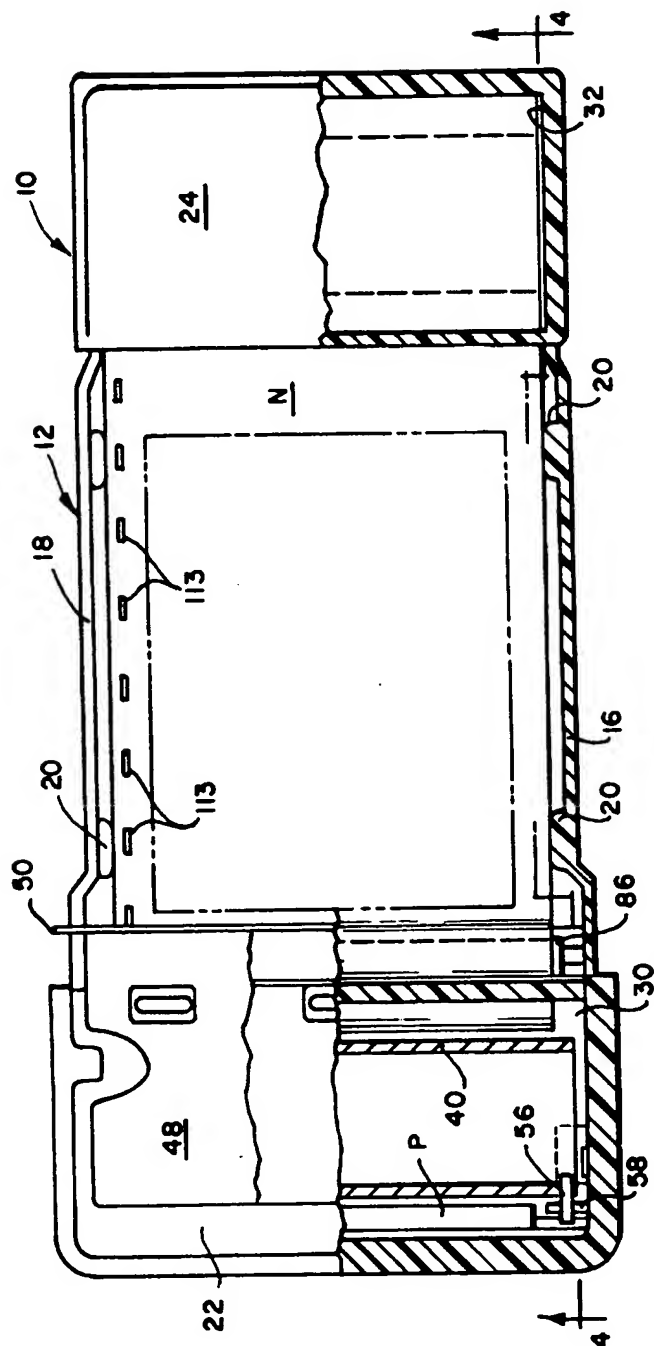
Mittel (122,126,150), um die bewegliche Einrichtung (46) aus der Öffnung (42) der ersten Speicherkammer (30) wegzuziehen, während das Element (P), das das Behandlungsmittel trägt, aus der ersten Speicherkammer (30) austritt,

wobei das Element (P) des Filmsystems, das das Behandlungsmittel trägt, in die erste Speicherkammer (30) als aufgespultes Band zugeführt wird, dadurch gekennzeichnet, daß die Speicherkammern (30,32) und die Bereithaltungsvorrichtung (14) Elemente einer Kassette (10) sind, die in den photographischen Apparat eingelegt werden kann, daß Mittel (56;52,54) vorgesehen sind, um wenigstens einen Teil des äußeren Umfangs des aufgespulten Bandes (P) gegen die innere Oberfläche der ersten Kammer (30) im Bereich der Öffnung (42) vorzuspannen, um die nicht aufgespulte Bandfläche mit dem Behandlungsmittel so klein als möglich und konstant zu halten, daß die Mittel zum Vorspannen des Teils des äußeren Umfangs des aufgespulten Bandes (P) gegen die innere Oberfläche der ersten Kammer (30) eine Rampe (52,54) aufweisen, um das aufgespulte Band (P) zu tragen und daß die Rampe nach der Öffnung (42) der ersten Kammer (30) geneigt ist.

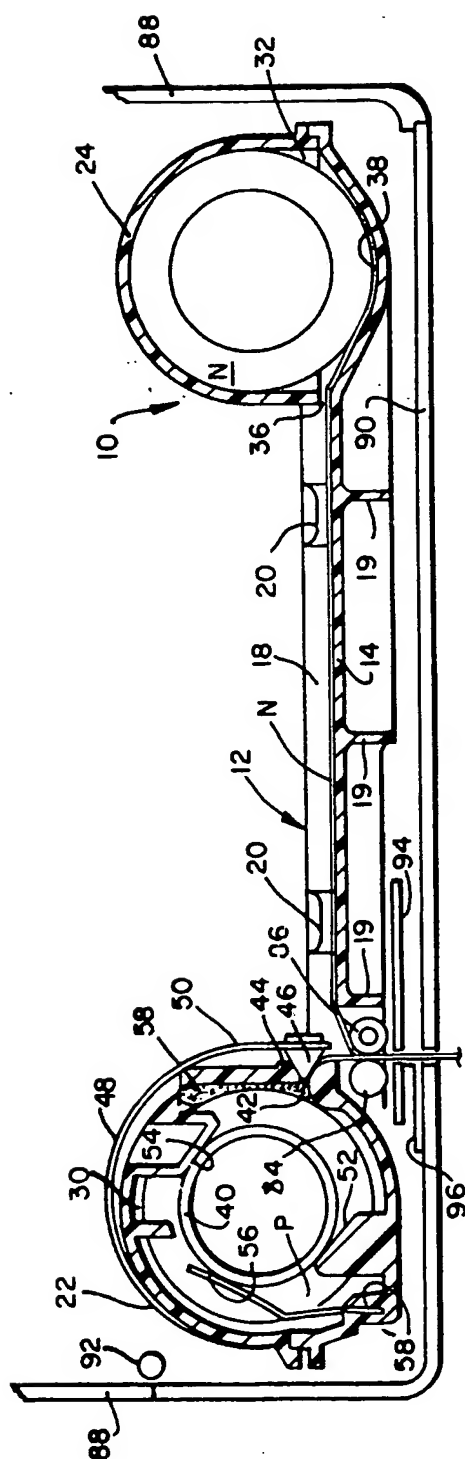
2. Apparat nach Anspruch 1, bei welchem die Mittel zum Wegziehen der Filmelemente (P,N) und zur Überführung der Elemente in flächenhafte Berührung aus zwei Quetschwalzen (84, 86) bestehen, die benachbart zur Öffnung (42) der ersten Kammer (30) angeordnet sind.
3. Apparat nach Anspruch 2, welcher Mittel (100) aufweist, um abwechselnd die Quetschwalzen (84,86) anzutreiben und die Filmelemente (P,N) wegzuziehen bzw. wenigstens eines der Elemente gegen Bewegung zu sichern.

4. Apparat nach Anspruch 1, bei welchem die beweglichen Mittel zum Abdichten der Öffnung der ersten Speicherkammer (30) einen Stopfen (46) und Mittel (48) aufweisen, um den Stopfen (46) lösbar im Dichtungseingriff mit der Öffnung (42) der ersten Kammer (30) zu halten. 5 auf die erste Kammer wirkt.
5. Apparat nach Anspruch 4, bei welchem die lösbaren Haltemittel eine Blattfeder (48) aufweisen, die fest gegenüber der ersten Kammer (30) gelagert ist, wobei die Blattfeder (48) den Stopfen (46) trägt. 10
6. Apparat nach Anspruch 1, bei welchem die Mittel zum Andrücken des Teils des äußeren Umfangs des aufgespulten Bandes (P) gegen die innere Oberfläche der ersten Kammer (30) außerdem eine Feder (56) aufweisen, um das aufgespulte Band (P) längs der Rampe (52,54) nach der Öffnung (42) der ersten Kammer hin vorzuspannen. 15 20
7. Vorrichtung nach Anspruch 1, welche Mittel (58,60) aufweist, um die überschüssige Flüssigkeit in der ersten Kammer (30) zurückhalten. 25
8. Apparat nach Anspruch 7, bei welchem die Mittel zum Zurückhalten der überschüssigen Flüssigkeit in der ersten Kammer (30) aus zwei Absorptionsstreifen (58,60) bestehen, die in der ersten Kammer (30) auf gegenüberliegenden Seiten der Öffnung (42) der ersten Kammer angeordnet sind. 30 35
9. Apparat nach Anspruch 4, bei welchem an der Außenseite des Gehäuses der ersten Kammer (30) eine schwach gekrümmte durchgehende Lippe (44) vorgesehen ist, die die schlitzartige Öffnung (42) umschließt und bei welchem der Stopfen (46) aus einem langgestreckten elastomeren Körper mit allgemein dreieckigem Querschnitt besteht, der der Gestalt der Lippe (44) komplementär ist. 40 45
10. Apparat nach Anspruch 5, bei welchem die Blattfeder (48) an der Außenseite der ersten Kammer (30) gelagert ist und die Blattfeder den Stopfen (46) trägt und diesen in die Dichtungsstellung vorspannt. 50
11. Apparat nach Anspruch 10, bei welchem die Öffnung (42) der ersten Kammer (30) in Längsrichtung über einen gegebenen Abschnitt der ersten Kammer (30) verläuft und die Blattfeder (48) sich vom Bereich der Öffnung um die erste Kammer (30) nach einer gegenüberliegenden Seite erstreckt, so daß die Federkraft 55





**Fig. 3**



**Fig. 4**

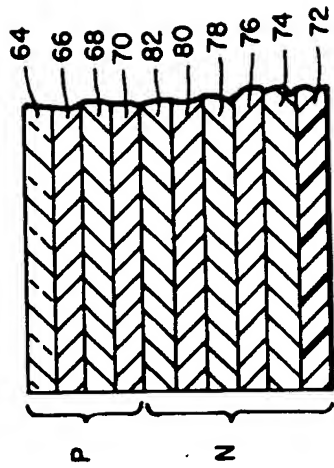


Fig. 6

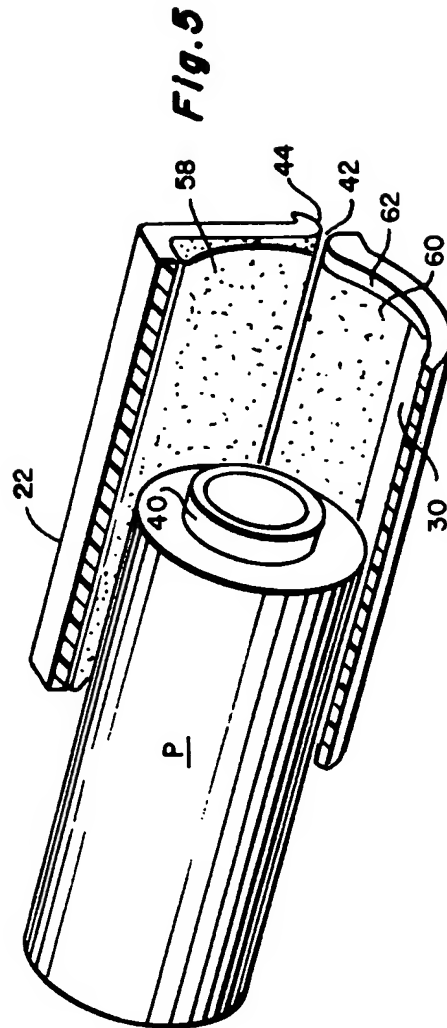


Fig. 5

**Fig.7**

